Name _____ Math # _____ Date _____

REVIEW THE INFORMATION BELOW. COMPLETE THE PROBLEMS **ON A SEPARATE SHEET OF PAPER!**

COMPOUND PROBABILITY AND COUNTING METHODS

COMPOUND PROBABILITY

Sometimes when you are finding a probability, you are interested in either of two outcomes taking place, but not both. For example, you may be interested in drawing a king or a queen from a deck of cards. At other times, you might be interested in one event followed by another event. For example, you might want to roll a one on a number cube and then roll a six. The probabilities of combinations of simple events are called **compound events**

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To find the probability of *either* one event *or* another event that has nothing in common with the first, you can find the probability of each event separately and then add their probabilities. Using the example above of drawing a king or a queen from a deck of cards:

$P(\text{king}) = \frac{4}{52}$ and $P(\text{queen}) = \frac{4}{52}$ so $P(\text{king or queen}) = \frac{4}{52} + \frac{4}{52} = \frac{8}{52} = \frac{2}{13}$

For two independent events, to find the probability of *both* one *and* the other event occurring, you can find the probability of each event separately and then multiply their probabilities. Using the example of rolling a one followed by a six on a number cube:

$$P(1) = \frac{1}{6} \text{ and } P(6) = \frac{1}{6} \text{ so } P(1 \text{ then } 6) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$

Note that you would carry out the same computation if you wanted to know the probability of rolling a one on a green cube, and a six on a red cube, if you rolled both of them at the same time.

Example 1

A spinner is divided into five equal sections numbered 1, 2, 3, 4, and 5. What is the probability of spinning *either* a 2 *or* a 5?

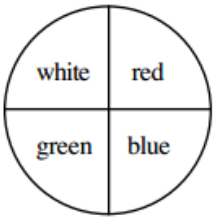
Step 1: Determine both probabilities: $P(2) = \frac{1}{5}$ and $P(5) = \frac{1}{5}$

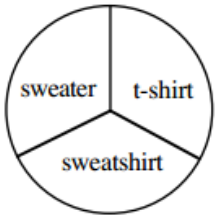
Step 2: Since these are *either-or* compound events, add the fractions describing each probability: $\frac{1}{5} + \frac{1}{5} = \frac{2}{5}$

The probability of spinning a 2 or a 5 is $\frac{2}{5}$: $P(2 \text{ or } 5) = \frac{2}{5}$

Example 2

If each of the regions in each spinner at right is the same size, what is the probability of spinning each spinner and getting a green t-shirt?





Step 1: Determine both possibilities:
$P(\text{green}) = \frac{1}{4}$ and $P(\text{t-shirt}) = \frac{1}{3}$

Step 2: Since you are interested in the compound event of *both* green *and* a t-shirt, multiply both probabilities: $\frac{1}{4} \cdot \frac{1}{3} = \frac{1}{12}$

The probability of spinning a green t-shirt is $\frac{1}{12}$: $P(\text{green t-shirt}) = \frac{1}{12}$

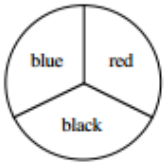
Show your work on a SEPARATE PAPER!

Problems

Assume in each of the problems below that events are independent of each other.

1. One die, numbered 1, 2, 3, 4, 5, and 6, is rolled. What is the probability of rolling *either* a 1 *or* a 6?

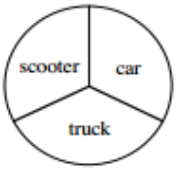
2. Mary is playing a game in which she rolls one die and spins a spinner. What is the probability she will get *both* the 3 *and* black she needs to win the game?

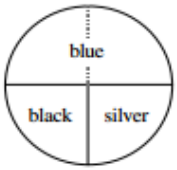


3. A spinner is divided into eight equal sections. The sections are numbered 1, 2, 3, 4, 5, 6, 7, and 8. What is the probability of spinning a 2, 3, or a 4?

4. Patty has a box of 12 colored pencils. There are 2 blue, 1 black, 1 gray, 3 red, 2 green, 1 orange, 1 purple, and 1 yellow in the box. Patty closes her eyes and chooses one pencil. She is hoping to choose a green or a red. What is the probability she will get her wish?

5. Use the spinners at right to tell Paul what his chances are of getting the silver truck he wants.





6. On the way to school, the school bus must go through two traffic signals. The first light is green for 25 seconds out of each minute, and the second light is green for 35 seconds out of each minute. What is the probability that both lights will be green on the way to school?

7. There are 250 students at South Lake Middle School. 125 enjoy swimming, 50 enjoy skateboarding, and 75 enjoy playing softball. What is the probability a student enjoys all three sports?

8. John has a bag of jellybeans. There are 100 beans in the bag. $\frac{1}{4}$ of the beans are cherry, $\frac{1}{4}$ of the beans are orange, $\frac{1}{4}$ of the beans are licorice, and $\frac{1}{4}$ of the beans are lemon. What is the probability that John will chose one of his favorite flavors, orange, or cherry?